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PRESIDENTIAL ADDRESS.

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ANNUAL BUSINESS MEETING.

Legislative Council Chamber, Halifax, 9th November, 1896.

The PRESIDENT, DR. GILPIN, in the chair.

The PRESIDENT addressed the Institute as follows :—

GENTLEMEN,—I have much pleasure in meeting you to-night. I present myself your representative to mark the close of another year of the existence of the Institute, and to inaugurate a new session.

In one sense, I may claim to be numbered among the oldest of those who have been interested in this Society. Although it is nearly a quarter of a century since I was allowed to read my first paper before you, there are a number of you who have been for a much longer period members.

I remember, however, being present and watching as a boy the initiatory meeting of the Institute, being the more interested as the late Dr. Gilpin, who read the first paper in our proceedings, took an active part. Almost all the original members have now ceased from work, but their record remains.

From its commencement, the Institute members have ranged over all the fields of science open to observers in this Province, and have recorded their opinions and deductions according to the lights of their days. Their arguments may now be displaced or amended in the focus of the science of to-day or to-morrow ; the facts they have accumulated

remain, and we may feel satisfied if we have contributed our quota of bricks to the daily increasing foundation of the sciences.

In every division of nature our deductions and laws remain good until rendered untenable by the unanswerable chill of fresh facts. The true student rejoices at the demolition of his fabric when he knows that the opportunity is offered of modelling it on a broader and surer foundation.

It is largely in the accumulation of facts that a useful future lies before us, and I would impress upon you the desirability of enrolling every person who can give careful and accurate observations upon the natural world surrounding us.

One discovery by one of our members of an important fact bearing on the protection of our agricultural products from the attacks of noxious insects, the introduction of a form of animal or vegetable life capable of anchorage here, and serving to our needs, or any similar discovery, would many times repay the money we have spent. We should have on our list every person willing to study in these or kindred branches, and to such substantial assistance should, I think, not be denied by you.

The transactions of the past session of the Institute will, I think, be considered, to say the least, quite up to the mark. Of most general interest will be found the portrait of our late friend, Dr. Lawson, and Prof. MacGregor's sketch of his busy and useful life. In addition to the regular papers, matters of interest were submitted at various meetings by Prof. MacGregor, Drs. MacKay and Somers. At a special meeting the Rev. G. Patterson read a valuable paper on "Newfoundland Folk Speech."

In the Transactions are two linked papers by Prof. MacGregor and D. McIntosh on the calculation of the conductivity of mixtures of electrolytes. The former showed by a graphical process, based on observations, the calculability of the conductivity of a series of mixtures of solutions of chloride of sodium and potassium. He found that the calculations agreed with the observations in dilute solutions, but not in stronger ones. The latter extended the observations in order to determine the differences between the observed and calculated values in the case of the stronger solutions, and the extent of agreement in the case of solutions of sodium chloride and hydrochloric acid which have ionic velocities differing more widely.

Among the geological papers is one on the unexplored coal fields of Nova Scotia by me, and an interesting note by Mr. T. C. Weston on a few new paleontological facts, and on the general similarity of the fossil faunas of the silurian of Canada and Newfoundland. Mr. Prest, in a paper on Glacial Succession in Lunenburg County, differs somewhat from the conclusions arrived at by the Geological Survey. Professors Bailey and Coldwell have referred in two papers to the Superficial Geology of Kings and Queens Counties, the former referring also to interesting exhibits of faulting, metamorphism, vein filling, contacts, etc. Dr. Somers has contributed a note on *Juniperus Communis*, from which it appears that instead of one variety, the most common, decumbent, being only found here, there is another less common having a shrubby form. I am pleased to be able to inform you that the Doctor has promised further contributions on botanical subjects.

Dr. MacKay has continued his important summaries of the reports of phenological observations made under the auspices of the Botanical Club of Canada.

The Transactions close with an interesting paper by Mr. Piers, our Recording Secretary, on the Orthoptera of Nova Scotia. I understand that he proposes to extend this paper, which embraces a study of much value to our agriculturists.

I think that it is now in order for me to thank you for your kindly consideration of the office of President during the past year. I feel that a good Council and a faithful staff of officers have endeavored not only to make his path easy, but to maintain and promote the progress of the Institute. To the Treasurer, the Librarian, and to the Secretaries, the thanks of the Institute are justly due. Having done so little myself, I can the more fairly estimate the value of their labors, and can honestly say, I believe, that if the members would treble their numbers they would so much the more willingly discharge their increased tasks.

It has occurred to me that a few remarks on the system of instruction and examination of mining officials instituted by the Government of this Province, may be of interest.

The Institute proceedings contain many papers upon geological and allied subjects, and any efforts tending to increase the observing and recording powers of those directing our mining operations cannot fail to be appreciated by you.

Wherever communities are engaged in a particular occupation, a certain average level of intelligence prevails. This standard never sinks below that essential to the earning of the wage paid, but it is with difficulty raised. The prominence of individuals due to their greater physical strength, or to the more practical application of their mental power to the subject of their work, excites envy rather than emulation. In such communities the first step upward is resistance against encroachments by the employer. Unions follow. In many cases this coalition of labor has no aims beyond the preservation of wages against reduction, and their increase at every opportunity. In some instances attempts have been made at boards of conciliation and arbitration, and sliding scales. These aspirations, however, are but the outcome of that experience of unionism which has shown that facts and natural laws must be considered, and may be called a selfish extension of the original scheme.

In Nova Scotia, the most powerful labor union is perhaps that of the coal miners. Its organization has given occasion for a conciliation and arbitration act, which promises well, altho' it has not yet undergone the ordeal of practical application. The outcome, however, of this organization, more interesting and ultimately useful, is that relating to education.

It was recognized by those who were mainly interested in the objects of the Provincial Workman's Association, and especially by the Hon. R. Drummond, the Grand Secretary, that the proper conduct of the business of the various lodges, the proper estimation of the social problems of politics, supply and demand, etc., thus suddenly presented, and the intelligent discussion of the labor and mining problems most directly affecting them, required that the intelligence and education of the members should be materially assisted. It soon became apparent that the better the members understood the problems of the miners' occupation the less liable were the different unions to be hurried passionately into ill-advised and half-considered conflicts with capital. It was also evident that the better the status of the subordinate officials about the mines the more the safety of the miners was secured. After some discussion it was agreed that the experiment should be tried of fixing a standard for underground managers and overmen. The necessary statutory power having been granted by the government, an order-in-council appointed a Board of Examiners tentatively. As experience was gained, changes were made until the present system, which has worked satisfactorily for some time, was established.

The Province, for the purpose of the Board, has been divided into three districts —Cumberland, Pictou, and Cape Breton. From each of these districts are appointed two men representing respectively the companies and the workmen, and a third, as far as possible, a mining engineer not interested in the operations of any company. The Inspector of Mines acts as Secretary and the representative of the Government on the Board. The questions are prepared by the Board at a full meeting ; the examinations held simultaneously by the local divisions of the Board ; and the answers considered at a full meeting of the Board.

It was soon found that many candidates were deficient in surveying and the knowledge of arithmetic, logarithms, geometry, etc., necessary for the solution of the problems of ventilation, etc. The most intelligent of the successful candidates, in many cases men who had unaided made themselves masters of these subjects, were appointed instructors for the candidates. In this way an annual course, some months in length, has been established at the principal collieries, about ten instructors being employed. The expenses of these schools are met by the Mines Department, and each teacher receives a fixed fee, contingent upon his presenting at least two candidates, in addition to a fee for each candidate that passes a successful examination.

The first certificate of competency was issued March 15th, 1883, and since that date 121 certificates have been issued to underground managers, 146 certificates to overmen, in addition to 32 certificates of service to those holding these positions at the time the law came into force. This system has established an ample supply of men for our own collieries, and those leaving our shores find their certificates a good passport to respectable positions abroad. The conditions of admission for a candidate are that he be at least twenty-one years of age, of good reputation, and have been employed at least five years underground. The readiness and precision of the answers of many of the candidates would do credit to examinations of a much more pretentious character.

It was finally decided that the provisions of the act should be extended to mine managers, and the powers of the Board were amplified. In all 41 certificates have been issued to managers. Quite a number of those holding manager's certificates are working miners who have successively passed the different examinations, one after the other, with intervals required to attain the additional knowledge. In one instance a foreigner, unable to speak or write in the English language when he

arrived a few years ago, has passed, not without failures, until he has been appointed a manager of a coal mine. This instance, perhaps the most extreme, illustrates the fact that the advantages offered by this scanty system of education are well received by the more ambitious and intelligent of our miners. In the end the lodges at the different collieries have profited as well as the mines, for I am informed no small percentage of their officials and leading men are holders of certificates. The fact that the miners recognize the fitness of such men to be their guides and advisors is a strong argument that moderation and wisdom will mark their deliberations.

As you know, at nearly all of our coal mines the men are raised from and lowered to the scene of their work by machinery. The drivers of these engines are always selected with much care, as they require to be reliable and steady men. It was decided that, in order to increase the margin of safety, these men should undergo examination as to their knowledge of boilers, machinery, etc. A Board of three mechanical engineers was appointed representing, as in the case of the Board I have already referred to, the three principal coal districts. The examinations are conducted in a similar manner, and already 74 certificates have been issued, including those certificates of service granted those engineers found worthily filling their positions at the time the law was passed. Whenever a class of candidates offers, mechanical instructors are appointed on the principle described already.

I may mention that the work of the instructors and boards has been facilitated by the provision made by law for the establishment of night schools in mining and other districts. Many candidates, as might be expected, however good their practical knowledge and experience may be, are deficient in the exact grounding required for examination. They can remedy this by attending the night schools, and the mining instructors are thus relieved of much drudgery and able to teach the essentially mining subjects with greater detail.

As is well known, the strength of a chain is precisely that of the weakest of the links composing it. In mining, however careful the overmen and watchmen may be, one ignorant or careless workman may nullify all their efforts and precautions, and in a moment lose his own or another's life, cause an explosion, or a fire. In order, therefore, that there might as far as possible be no lack of endeavor to make all safe, it

was determined that the miners themselves should be examined as to their practical experience and knowledge. This has been carried out, and I believe there is not a coal miner working to-day, except perhaps in a few mines open only a few months in the winter, who is not the holder of a certificate. After a certain period of employment under ground as loader, driver, etc., he is permitted to assist in cutting coal. The miner, however, in charge of the place in which he works and assists, is the holder of a superior certificate secured by examination. These examinations and the issue of certificates is effected through local boards appointed at each colliery and paid by a small fee.

These boards also examine applicants for the position of shot firers. These are men who are, under certain conditions of the mines, appointed to supervise the firing of the charges of gunpowder or other explosive used in blasting the coal. I may say these examinations of miners and shot firers are *viva voce*, all the others being by written answers.

While the business connected with these examinations has added materially to the work of the Inspector of Mines, it is a satisfaction to know that the results so far have been encouraging. The standard exacted from the candidates compares well with that required in other countries. The Government and people of Nova Scotia may feel pleased that in this respect we have gone ahead of other countries, and have made a successful attempt to place within the reach of every coal miner in the Province the means of his advance to a state of education, and an opportunity of fitting himself for responsible and respectable positions.

While explosives are permitted in coal mines, and while work is necessary in dangerous atmospheres with lamps liable to accident, even with the greatest care in manufacture and use, so long must the recurrence of disasters be expected. I will not dwell upon this subject, but wish to point out that the mining authority of the Province has taken every step possible to minimise these dangers by its examinations of men and officials.